Printed Circuit Board Transmission Lines

Recall that a transmission line must consist of two separate conductors. Typically, the volume between these conductors is filled with a very low-loss dielectric.

For example, a coaxial line has an inner conductor (conductor #1) and an outer conductor (conductor #2), with the cylindrical space between filled with dielectric.

However, we can likewise construct a transmission line using printed circuit board technology. The substrate of the circuit board is the dielectric that separates two conductors. The first conductor is typically a narrow etch that provides the connection between two components, while the second conductor is typically a ground plane.

Below are some of the most popular types of printed circuit board transmission lines:
**Microstrip**
Probably most popular PCB transmission line. Easy fabrication and connection, yet is slightly dispersive, lossy, and difficult to analyze.

**Stripline**
Better than microstrip in that it is not dispersive, and is more easily analyzed. However, fabrication and connection is more difficult.

**Coplanar Waveguide**
The newest technology. Perhaps easiest to fabricate and connect components, as both ground and conductor are on one side of the board.

**Slotline**
Essentially, a dual wire transmission line. Best for “balanced” applications. Not used much.
An antenna array feed, constructed using microstrip transmission lines and circuits.

A wideband microstrip coupler.